Health Information System for Community-Based Multiple Screening

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Background: Disease screening is one of important activities in the domain of public health. However, traditional disease screening is based on solitary disease rather than multiple diseases. Although information accrued from multiple screening make contribution to health risk assessment as well as efficient management, data sources underpinning multiple screening are diversified and complicated including registration, primary data from questionnaire or biological measurement, referral system, confirmatory diagnosis, and case management. As our multiple screening integrates five types of cancers and four types of chronic disease at each out-reach and ambulatory setting, packages for attendants vary according to age, gender and risk factor (such as betel chewing, alcohol drink, smoking, family history, self-disease history, etc.). We took the initiative in design of health information system to support the complex processes of multiple screening. To enhance the efficiency of multiple screening and efficient disease management, health information system was therefore designed to support such a complicated infrastructure.

Design and Implementation Based on the principle of Entity-Relation model, we integrated diverse data sources to gain more potential value than sum of the parts, including population registration system, pap smear system, screening findings, follow-up, referrals, and confirmatory diagnosis. The framework of system was implemented by Microsoft SQL server, PHP and APACHE. Evidence-based screening principle and guideline of preventive health service packages were embedded in the control of quality of screening and management system. Authorities of download, upload and update were graded by management positions. Firewall, fixed access IP, and password verification were incorporated to guard against security of database. Progressive reports associated with screening were also incorporated for administration affairs.

Result and Evaluation A total of 398 ambulatory settings were held for the period from 1999 through 2002, including 53429 eligible attendants aged 30-79 years. The throughout output performance directly attributed to our information system were demonstrated as follow. From the aspect of completeness and accuracy of data, the missing rates decreased from 2.27%, 0.00% to 0.00% for the period from 1999 through 2002. The duplicate rates also decreased from 3.97%, 0.29% to 0.02%. Rate of inaccuracy also decreased from 0.86%, 0.10%, to 0.00%. The proportion of household registration also increased from 88.54%, 96.88% and 96.30%. From the aspect of effective management, rate of colonoscopy referral increased from 67.13% to 73.97% and rate of abdominal ultrasound referral also increased from 77.37% to 88.52%.

Conclusion This system not only facilitated the integration of multiple screening but also the built-up of standardized workflows of each disease. It also improved the quality of health information collection that provides a underlying infrastructure for academic research; furthermore, cost-effective of screening and medical decision making will be promoted on the basis of this infrastructure.

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